

Scotland's Rural College

SAC Cereal Recommended List for 2007

Cranstoun, DAS; Hoad, SP

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RECOMMENDED



HGCA

SAC cereal recommended list for 2007

£5.00

INTRODUCTION

Recommendations are made by SAC and are based on data collected as part of the HGCA Recommended Lists' system. The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com): this includes information on varieties not mentioned on the SAC list. Some of the detailed agronomy advice is based on HGCA's RL Plus 'varieties on your farm', this interactive programme is also available on HGCA website.

To improve the regional application of cereal trials, the UK is divided into several regions. The yields on page 8 are based on trials in the arable east to the north of Durham. For minor crops the yields are UK yields; the spring wheat yields are from spring-sown trials.

A variety is not recommended until it has completed at least three years in trial. If the UK performance indicates a consistent economic benefit over the best existing comparable variety and there are no unacceptable weaknesses, the candidate is given a UK provisional recommendation (P); varieties that do not merit a UK recommendation but have a specific use are given PS. In the table on pages 8 and 9, the fully recommended varieties are listed in order of fungicide treated yield; this is expressed as a percentage of the average treated yield of specified control varieties.

A variety may demonstrate advantages or disadvantages under commercial production and marketing that are not evident in field trials. In due course this additional information is included in the notes on varieties. The disease resistance scores indicate the current situation; experience has shown that resistance to mildew and yellow rust may not be maintained.

Assessment of quality is provided by the Malting Barley Committee, the Scotch Whisky Association, the Scottish Flour Millers' Association, the Scottish Oat Millers and others assisting HGCA Crop Evaluation Committees.

Supplies of multiplication seed (Basic and Certified 1st Generation) may not be generally available; C2 seed stocks of the newer varieties may be limited.

In case of doubt, or for information about varieties not listed, farmers should consult their SAC agricultural advisers or the HGCA website.

CHOICE OF VARIETY

Before choosing a variety consider the following factors and decide which restrict your choice:

- Sale for brewing, distilling or milling (check with your buyer).
- Specific weight.
- Earliness or need to spread the harvest period.
- Ear loss and sprouting risks.
- Disease risk (see below).
- Straw strength and length (barley straw can be of considerable value).

Having eliminated the inappropriate varieties, select from the remainder those with the highest yield potential.

There is a large wheat market for grain whisky production in Scotland. Although some hard wheat may be used, this can cause processing problems so there is a strong preference for **soft** grain of large grain size, low protein content, with good specific weight and low screenings. Ratings for distillery performance range from Good for Istabraq to Poor for all hard wheat varieties and those soft wheat varieties carrying the 1b/1r rye gene translocation; hard wheat varieties and those giving a reduced alcohol yield, or process limitation, are discouraged by distillers. Grain whisky production also uses high enzyme malted barley: sourced from Scotland, Decanter dominates this sector but Maresi is also used.

For biscuit-making, soft wheat is preferred. The Hagberg Falling Number should exceed 100, protein should be above 10.7% (on a dry matter basis using the Dumas method) and the gluten must not be damaged by high temperature drying.

There is also demand for bread wheat but only if quality specifications are fully met. Because of our climate, Scottish wheat is generally lower in protein than its English counterpart. In wet harvests

the Hagberg Falling Number is so severely reduced that grain is unlikely to meet bread-making requirements.

To assist exports and help foreign millers and bakers recognise the characteristics of UK varieties, HGCA is promoting two brands. **uks** covers soft extensible varieties that can be used for biscuit-making or blended into a bread-making flour. **ukp** covers semi-hard varieties that suit both EU and non-EU bread-making.

The intervention market for wheat is restricted to common wheat; Cordiale, Einstein, Malacca and Solstice are eligible for intervention.

Quality requirements are becoming more precise especially as characters affecting processing are taken into account. In the malting barley market some varieties are acceptable for distilling but not for brewing. Some varieties are inclined to dormancy, this can prejudice their use by maltsters. Others are prone to splitting and skinning; both conditions may lead to rejection by maltsters. The IBD Approval system (formerly IoB Approval system) is now based on malt use with Approval lists for brewing and distilling (see page 8). As part of product protection, the Scotch Whisky Association will not support varieties which produce GN levels significantly above Optic; the distilling industry's long term requirements will be for GN 'non-producing' varieties such as Appaloosa, Decanter, Oxbridge and Troon. An asterisk carries Approval based on a minimum number of satisfactory commercial scale tests. (*1) is Provisional Approval based on satisfactory micro-malting or lab results; a variety is moved to Stage 2 Provisional Approval (*2) if the initial commercial scale tests are satisfactory.

There is some demand for winter malting barley for brewing but in practice only a small proportion of the Scottish crop meets the grain nitrogen and other specifications. The Malting Barley Committee will grant (IBD) Approval to winter barley grown in Scotland, Pearl is the only currently Approved variety.

About 80% of the oats that are sold go for milling. To meet this market it is important that grain is properly dried **before** quality is impaired. Milling specifications are likely to include specific or bushel weight and screenings in addition to moisture content, but in some markets kernel content and freedom from discoloured groats are very important. There is a developing market for PGR-free oats.

Specific weight is important in the marketing of grain, particularly for intervention; it is very dependent on growing conditions. High specific weight varieties are less likely to incur discounts or risk rejection.

REDUCING DISEASE RISK

(a) The most economic way of avoiding yield loss due to disease is to grow disease resistant varieties.

Disease ratings are calculated from assessments of disease in naturally infected trials throughout the UK and in inoculated tests. Ratings are UK ratings on a 1-9 scale, where 9 indicates good resistance and 1 poor resistance. A rating is an indicator of disease risk. It describes the likely severity of infection when conditions favour disease development and compatible races of the disease are present. Where conditions are less favourable to a particular disease, or compatible races are absent, a variety may appear more resistant than indicated by its rating. Occasionally, a variety may be less resistant than expected due to the emergence of a new race of disease that overcomes its resistance.

Varieties with a rating of 8 or 9 are sufficiently **resistant** that the disease is unlikely to reduce yield.

Varieties with ratings of 6 or 7 are **moderately resistant**. Disease may develop under favourable conditions, but yield is unlikely to be substantially reduced.

Varieties with ratings of 4 or 5 are **susceptible** and are likely to become severely infected under conditions favourable to the disease. Fungicides will probably be required.

Varieties with ratings of 1, 2 or 3 are **very susceptible** and are likely to become severely infected. Such varieties initiate epidemics. Routine fungicide treatment will be necessary.

Variety resistance can sometimes break down within season. This is most likely to happen where a variety relies on a single major gene for its resistance. If this occurs the rating may change from 9 (good resistance) to 4 or lower (susceptible). Winter barley varieties with *Rhynchosporium*

resistance ratings of 6, 7 and 8 should be regarded as susceptible and those varieties with 5 or less are very susceptible. Varieties of winter barley susceptible to mildew, yellow rust, brown rust, *Rhynchosporium* net blotch or *Ramularia* may act as sources of infection for spring barley crops. Fungicides applied in the spring to winter barley will reduce disease spread to spring barley. Spring barley varieties susceptible to the prevalent diseases will also need to be protected by fungicide seed treatment or sprays.

Septoria tritici is currently the most common disease of wheat. Recent issues concerning fungicide resistance to strobilurin (QoI) fungicides and triazole (DMI) fungicides mean that varietal resistance is becoming more important to manage this disease: Alchemy (rated 7) is the most resistant of the recommended varieties.

Septoria nodorum has declined as a significant disease of winter wheat, however it can still occur and may be overlooked as symptoms are less easy to identify than those of *Septoria tritici*. Consort, Cordiale and Einstein are the most susceptible recommended varieties to *Septoria nodorum* (resistance rating of 4 or 5).

(b) Diversification of varieties

Principles of variety diversification:

Overall levels of certain diseases, especially barley mildew and wheat yellow rust are increased if the more susceptible varieties are grown. The risk from these diseases is reduced if more than one variety of barley or wheat is sown, provided varieties which are to be grown in adjacent fields in the same year, or in the same field in successive years, or in a mixture, are not susceptible to the same races of the pathogens.

On the basis of information supplied by the UK Cereal Pathogen Virulence Survey, barley varieties have been grouped into Diversification Groups (DG) according to the races of mildew which attack them. Wheat varieties have been grouped according to the races of yellow rust to which they are susceptible as adult plants. These diversification groups are shown in the table on page 9.

Winter wheat yellow rust:

Yellow rust is a serious threat to yield in certain varieties. The sudden appearance of new races on previously resistant varieties can occur and regular inspection of all varieties is important, irrespective of rating. This is particularly the case in 2007 now that yellow rust has reappeared as a common problem in winter wheat.

The risk of spread of yellow rust is low where Alchemy, Istabraq, Malacca or Solstice are grown together or with any one other recommended variety and where Cordiale is grown with Consort or Einstein or Oakley or Robigus.

There is a high risk of spread from any other combination of recommended varieties. Robigus (resistance rating 3) and Consort (resistance rating 6) are both in Diversification Group 7; if yellow rust develops on Robigus, there is a high risk that it will spread to Consort.

Barley mildew:

Varieties in Diversification Group 0 (Accrue, Bronx, Camion, Pearl, Pelican, Pict and Retriever) do not contribute to the diversification of varieties to reduce the effect of mildew on the crop but note that DG0 varieties with high resistance ratings e.g. Pict are effective at limiting the potential of an epidemic.

Varieties in Diversification Group 1 (Appaloosa, Decanter, NFC Tipple, Publican, Quench, Riviera, Troon, Waggon, Westminster and the winter barley Amarena) are currently resistant to mildew and are good partners to all varieties.

Varieties in Diversification Groups 3 (Doyen), 4 (Cocktail), 9 (Optic), 10 (Boost, Saffron or Sequel) and 14 (Oxbridge or Rebecca) may be grown with Amarena or any of the other recommended spring varieties on the SAC list apart from those in the same DG.

EYESPOT AND SHARP EYESPOT

Recent research has developed a risk assessment for eyespot; it is available at www.sac.ac.uk/crops. High risk factors include wheat or a cereal as the previous crop, ploughing compared to minimal tillage, early sowing, high spring rainfall and the presence of disease at GS31-32. Absence of disease at GS31-32, either visually or by diagnostic assessment, does not necessarily pose a low risk.

Sharp eyespot is less common, but when infection is severe, yield loss and lodging can occur. All varieties of wheat are susceptible to some degree.

SNOW ROT

Snow rot has receded as an important disease of winter barley but a move to short rotations, earlier sowing and minimum cultivations would encourage it. There is insufficient evidence to give susceptibility ratings. Consideration should be given to the protection of advanced lush crops especially where the previous crop was winter barley, snow is likely to lie or where crops are weakened by manganese deficiency.

SEED-BORNE DISEASES

Loose smut is a seed-borne disease found mainly on open-flowering barley varieties (most winter and spring varieties). Certified seed will have a guaranteed low incidence of loose smut but infection can build up rapidly in home-saved seed.

Leaf stripe became common in spring barley in 1990. Adoption of a voluntary standard for seed infection and the use of effective seed treatments has resulted in a significant reduction in its incidence; however, the disease remains a threat to spring barley.

Recent research has shown that *Rhynchosporium* and *Ramularia* can be seed-borne. *Rhynchosporium* on the seed can lead to widespread infections on winter barley in February.

Where loose smut or leaf stripe is found in a growing crop from which seed is to be taken, the seed should be tested for these diseases at the Official Seed Testing Station for Scotland, 1 Roddinglaw Road, Edinburgh EH12 9FJ.

It is recommended that all winter wheat seed is treated to protect against *Microdochium nivale* and Bunt.

BARLEY SPOTTING

Barley spotting has been common on several varieties in the last decade causing yield loss and high screenings. Spotting appears on the upper leaves at ear emergence; in extreme cases the top two leaves die. This damaging effect can be significantly reduced if protectant fungicides (e.g. strobilurins, triazoles, chlorothalonil in mixtures) are applied at the boot stage before ear emergence, but not all forms of spotting respond to fungicide treatment. These fungicides will improve green leaf area retention, but it is common for spots to appear late in the season in some varieties. Some fungicides (e.g. mildew eradicates) may even reduce green leaf area if applied late in the season under certain circumstances. Varieties have been categorised for their resistance to leaf spots and also for green leaf area retention.

In recent years, barley spots developed late in the season in winter barley; this problem can be minimised with fungicides used as on spring barley.

BARLEY MILD MOSAIC VIRUS

This virus (BaMMV) and the close relative BaYMV are carried by a soil-borne fungus and can cause serious losses in winter barley. BaMMV is present on a small number of farms in Aberdeenshire and East Lothian. Use of resistant varieties is the only method of preventing the disease. The varieties on the SAC list that are resistant to the common strain are Boost, Bronx, Pelican, Pict, Retriever and Sequel. For further details about other resistant varieties see the HGCA website or Recommended List.

ERGOT

Ergot can affect all cereals and it is common in seasons where the flowering period is extended by cool wet weather. It is becoming common and this is serious as some users have zero-tolerance at intake. There is very little data on variety resistance and ergot has been reported in a range of varieties. Triticale poses the highest risk, as do infertile secondary tillers. Grass-margins, grass weeds, set-aside and contaminated seed are potential sources of ergot.

ORANGE BLOSSOM MIDGE

Orange blossom midge was rare in Scotland but it has been seen in crops as far north as Tayside in 2006 so growers should be alert to it in future. Robigus and Oakley have genetic resistance to this pest, so do other varieties; see the HGCA website or Recommended List.

VARIETY RESPONSE TO DISEASE CONTROL

All trials include treated plots assessed for yield. As only a few trials have untreated plots that are assessed for yield, the untreated yield column on page 8, has been changed to indicate the UK

yield penalty where treatment is not provided.

The programmes of fungicides for barley and wheat are comprehensive; the intention is to keep all diseases to a minimal level throughout the growing season thus allowing maximum yield potential to be achieved. For spring barley the programme consists of a two or three-spray programme depending on mildew and *Rhynchosporium* pressure. For winter wheat it is a three or four-spray programme and for winter barley a three or five-spray programme depending on disease incidence or risk. For oats it is a two or three-spray programme.

SPRING BARLEY

IBD support for distilling and brewing

PUBLICAN (New Farm Crops, Syngenta, Market Stainton)

A very high yielding new provisional recommendation with a micro-malting analysis that indicates potential for both malt distilling and brewing. Like Optic, it is classed by distillers as a low GN producer. On limited data, its grain nitrogen tends to be high so growers should be cautious over nitrogen rates. Screening losses are likely to be relatively low. It has good resistance ratings for mildew and *Rhynchosporium*, average ratings for *Ramularia* and green leaf area retention but low resistance ratings for yellow and brown rust. It shares Optic's maturity rating but has better straw characters. It may be suitable for pearling. On limited early evidence, it yields relatively better on lighter lower potential soils, at low altitude and in NE Scotland.

COCKTAIL (New Farm Crops, Syngenta, Market Stainton)

Fully recommended and IBD Approved for both brewing and malt distilling with a malt extract slightly above Optic; it shares Optic's tendency to low nitrogen grain but in some years high screening losses could limit its market. Like Optic, it is classed by distillers as a low GN producer. It is widely used for brewing with over 40% of the market share in England but in Scotland distilling use is limited with a market share of only 4% in 2006; check with your buyer if it is intended for distilling. It has some export potential. It is slightly earlier than Optic with better resistance to brackling and ear loss. It is shorter than Optic, stiffer and has a profuse tillering habit that adds to the pressure on screenings in some years, especially if sown late. Resistance to mildew is rated 7; it may need protection with fungicide. It is potentially weak for yellow rust. It is vulnerable to *Ramularia* and has poor green leaf area retention. It has good BYDV resistance. It yields well on the heavier soils and is well adapted to a range of situations.

OPTIC (New Farm Crops, Syngenta, Market Stainton)

IBD Approved for both brewing and malt distilling; it has markets across a wide band of nitrogen content as it is also recognised as an export variety. It is classed by distillers as a low GN producer. Its share of the Scottish malting market in 2006 was again over 60%; in England its market share is just over 40% with Cocktail also taking over 40%. Its tendency to low nitrogen is attractive to distillers. Mildew resistance is poor especially at the seedling stage: it is vulnerable to *Rhynchosporium*, *Ramularia* and brown rust but is less affected by abiotic spotting. In some areas its maturity will be unacceptably late: in recent years the trend has been to breed varieties of similar or even later maturity! Brackling can be a problem in a delayed harvest. It has good resistance to BYDV. It is a rather high tillering variety so high seed rates should be avoided. Optic is relatively higher yielding on lower potential and lower lying situations; it does less well in SW Scotland.

IBD support for distilling only

APPALOOSA (Nickerson, Rothwell)

A high yielding provisional recommendation. Based on micro-malting analysis it has IBD Provisional Approval Stage 1 for malt distilling; it is a GN non-producer. Screenings are higher than average but it tends to produce grain at the lower end of the nitrogen range. As it does not have support for brewing or grain distilling, growers should concentrate on malt distilling requirements. It is very vulnerable to *Rhynchosporium* but carries useful resistance to mildew, yellow rust and *Ramularia* as well as having good green leaf area retention. Maturity is similar to Optic but it has stiff straw with good resistance to brackling. Avoid late sowing as this often leads to higher screening losses; on limited evidence, Appaloosa appears to under-perform on sandy soils and at the higher altitudes but it has done well in NE Scotland.

OXBRIDGE (Nickerson, Rothwell)

Fully recommended with IBD Approval for malt distilling; as a non-producer of GN with a high spirit yield, its potential looks good but some distillers may require further commercial testing before committing to this variety. It has low screening losses. With a low DP it is unlikely to be used for

brewing or grain distilling so growers should concentrate on the lower part of the nitrogen spectrum; it tends to produce grain at the lower end of the nitrogen range. Its large grain size is attractive for pearling where it may have a market if the grain nitrogen is above the malt distilling specification. It is in DG14 for mildew, rated 7 and may need protection; it has better than average *Rhynchosporium* resistance; it has moderate *Ramularia* resistance and good ratings for abiotic spotting and green leaf area retention. It is potentially vulnerable to yellow rust. It has stiff straw, good resistance to brackling and is a little earlier than Optic. It is well adapted to early sowing, heavier soils, high potential sites and it yields particularly well in NE Scotland.

TROON (Nickerson, Rothwell)

In two of the last three years Troon has disappointed the distilling industry with grain nitrogen levels exceeding the threshold for acceptance. It is a GN non-producer with Approval limited to distilling but should now be regarded as becoming outclassed now that Oxbridge is available and approved. With a low DP it is unlikely to be used for brewing. It produces lower screenings than Optic. It has average length straw, earlier maturity than Optic and moderately good resistance to brackling. It is vulnerable to *Rhynchosporium*, *Ramularia* and brown rust and has below average green leaf area retention. Troon should be sown early with preference given to the lighter textured soils.

DECANTER (Nickerson, Rothwell)

IBD Approved for malt distilling, it is the only recommended variety suitable for grain distilling where there is an additional requirement for high grain nitrogen. It is a GN non-producer. It is maintaining a 10% share of the Scottish malt market and has the advantage of markets across a range of nitrogen contents but it no longer carries IBD Approval for brewing. There is a specific requirement from several malt distilleries for low nitrogen non-producers of GN but some of these are likely to use Oxbridge, Troon and Appaloosa. Small grain size can result in high screening losses over the conventional 2.5mm screen; it is sometimes traded over a smaller screen. Husbandry measures such as early sowing, reducing the seed rate and delaying the nitrogen top-dressing have a beneficial effect on screening levels. It has good ratings for resistance to *Ramularia*, abiotic spotting, brackling and retention of both ears and green leaf area. Mildew resistance is good. It has stood well in recent Scottish trials and appears suited to upland conditions.

IBD support for brewing only

QUENCH (New Farm Crops, Syngenta, Market Stainton)

A very high yielding new provisional recommendation. Based on micro-malting analysis, it is equivalent to several existing varieties for brewing; it will not qualify for distilling support as it does not meet the requirement for limiting GN. Its straw is shorter than average but carries good resistance to brackling. *Rhynchosporium* resistance is above average and it has good green leaf area retention but it is potentially vulnerable to both yellow and brown rust.

NFC TIPPLE (New Farm Crops, Syngenta, Market Stainton)

A high yielding recommendation with full IBD Approval for brewing. It has potential in some export malt markets but is unlikely to be used by the distilling industry as it does not meet their requirements for limiting GN. It is rather short and late for a feed variety but the straw is stiff with good resistance to brackling; green leaf area retention is good. It has good resistance to mildew, brown rust and abiotic spotting but weak resistance to *Rhynchosporium* and it is potentially weak for yellow rust. It has potential for pearling but acceptability is very dependent on the sample. There are indications that it has done relatively better in SE Scotland and on high potential sites with a small bias towards lighter soils.

WESTMINSTER (Nickerson, Rothwell)

Fully recommended with IBD Provisional Approval Stage 2 for brewing; it has a much higher malt extract potential than the other recommended varieties. It is unlikely to be used by the distilling industry as it does not meet their new requirements for limiting GN. Its main use in Scotland is likely to be as a tall feed variety with good disease resistance. Depending on sample quality, it may be taken for pearling. It is very tall but has stood well in Scotland. It has excellent resistance to both mildew and *Rhynchosporium* and good green leaf area retention, but this may contribute to late maturity. In some seasons it could be vulnerable to brown rust. It is rated highly for resistance to both *Ramularia* and abiotic spotting. It also shows potential for whole-crop. It has yielded well on heavier soils, low potential sites and in SW Scotland.

Feed varieties

WAGGON (New Farm Crops, Syngenta, Market Stainton)

A fully recommended UK variety that is new to the SAC Recommended list. It is a very high yielding

SAC RECOMMENDED

Year First Listed			Grain yield as a % of fungicide Treated controls	Yield loss if untreated %	Use B=brewing D=distilling GD=grain distilling	Malting Approval†	Screenings <2.5 mm %	Specific weight kg/hl	Resi to ea 1 poor
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SPRING BARLEY

2005	R	Waggon	107	10	Feed	No	7.6	68.5	
2005	R	NFC Tipple	105	12	B	*	7.9	69.0	
2004	R	Rebecca	104	8	Feed	No	9.9	67.4	
2005	R	Oxbridge	103	9	D	*	5.6	70.2	
2003	R	Cocktail	102	12	B&D	*	11.3	70.2	
2005	R	Westminster	102	6	B	(*2)	6.9	70.6	
2004	R	Doyen	102	7	Feed	No	7.6	69.2	
1995	R	Riviera	99	8	Feed	No	5.8	71.4	
2003	O	Troon	98	7	D	*	6.0	69.7	
1995	R	Optic	97	17	B&D	*	10.3	70.4	
1999	R	Decanter	95	8	D&GD	*	13.5	70.1	
2007	P1	Quench	108	10	B	-	7.6	68.6	
2007	P1	Publican	107	9	B&D	-	6.5	69.7	
2006	P2	Appaloosa	105	12	D	(*1)	10.4	68.7	

Suitability
light soils
1-9
poor-good

WINTER BARLEY (100 = 8.7 t/ha, 69 cwt/acre)

2005	R	Amarena	107	15	7	No	16.3	64.8	
2005	R	Saffron	104	19	7	No	7.7	70.4	
2003	R	Sequel	104	20	6	No	22.6	70.1	
2004	R	Camion	102	21	7	No	9.0	71.6	
2002	O	Pict	101	20	7	No	30.5	70.6	
1999	S	Pearl	99	18	5	*	7.1	70.8	
2007	P1	Bronx	114	23	6	No	30.4	67.2	
2007	P1	Retriever	113	26	8	No	19.5	66.4	
2007	P1	Pelican	113	22	9	No	16.2	64.4	
2006	P2	Boost	109	22	6	No	10.7	69.6	
2007		(Accrue)	105	18	8	No	16.2	69.9	

Quality Markets				Specific weight kg/hl	100 v
Suitability As 2 nd cereal 1-9 poor-good	Distilling	Biscuit	Bread		

WINTER WHEAT (100 = 9.8 t/ha, 78 cwt/acre)

2004	R	Istabraq	106	22	5	Good	Poor	Poor	78.2	
2003	R	Einstein	105	19	7	Poor	Poor	Medium	77.1	
2003	R	Robigus	102	18	2	Medium	Good	Poor	76.4	
2004	S	Cordiale	102	23	8	Poor	Poor	Medium	79.1	
1995	R	Consort	100	27	7	Medium	Good	Poor	76.8	
2002	S	Solstice	100	20	6	Poor	Poor	Good	78.4	
1999	S	Malacca	96	20	7	Poor	Poor	Good	75.2	
2007	P1	Oakley	(110)	19	3	Poor	Poor	Poor	75.3	
2006	P2	Alchemy	104	15	4	Medium	Poor	Poor	77.3	

Colour code **Good** **Tends to be good** **Intermediate**

R = Recommended for general use

S = Specific use variety

P = Provisional

O=No longer in trial, becoming outclassed

The full data collected and the H

DED CEREALS 2007

Resistance to ear loss 1-9 poor-good	Maturity days +later -earlier than average	Straw strength 1-9 weak-strong	Straw length + taller cm -shorter than average	Brackling risk 1-9 high-low	Disease 1 = susceptible Mildew	9 = resistant Rhynchosporium	Green leaf area retention 1-9 Poor-good	Diversification group‡
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8	0	9	0	8	8	4	7	1
8	+1	8	-6	8	9	4	8	1
8	0	8	+6	4	7	8	8	14
8	0	9	+1	8	7	7	7	14
8	0	9	-5	9	7	5	6	4
7	+1	8	+8	6	9	8	8	1
8	0	9	-2	8	8	7	6	3
6	-1	7	+4	8	8	5	7	1
8	0	8	-2	7	9	4	6	1
7	+1	8	0	5	5	4	7	9
8	0	9	+1	8	9	6	8	1
(8)	+1	8	-3	8	9	7	(7)	1
(7)	+1	8	-1	7	9	8	(7)	1
7	+1	9	-2	8	8	4	8	1

				BaMMV R=resistant	Mildew	Rhynchosporium	Net Blotch	Diversification group‡
7	-1	8	+4		9	8	8	1
8	+1	8	-9		4	6	8	10
8	-1	7	+8	R	6	8	7	10
7	-1	7	-9		5	7	8	0
8	-1	7	+3	R	7	8	6	0
6	+2	7	+2		6	7	5	0
(8)	-1	5	+8	R	7	8	8	0
(7)	0	7	-13	R	6	8	7	0
(7)	0	7	+6	R	7	8	6	0
7	-1	7	+4	R	7	8	8	10
(7)	+1	8	-9		6	8	8	0

1000 grain weight g	Maturity days	Straw strength	Straw length	Resistance to sprouting	Mildew	Yellow rust	Septoria nodorum	Septoria tritici	Diversification group‡
49.2	+2	7	+7	5	5	9	8	5	1
50.8	0	7	0	6	6	6	5	5	10
45.7	+1	7	+1	5	7	3	8	6	7
47.3	-1	9	-6	6	6	6	5	5	4
50.7	+2	8	-2	6	6	6	4	4	7
50.8	0	8	+5	7	4	9	6	5	1
45.7	-1	7	-2	6	6	9	7	5	1
(49.2)	0	6	-1	-	7	6	-	6	10
(48.4)	+1	7	+3	-	7	9	(8)	7	1

liate Tends to be poor Poor

‡Disease risk can be reduced - see notes on pages 3 and 4	† As assessed by the Malting Barley Committee
- Insufficient information	* Approved as a malting variety
() Provisional ratings	(*1) & (*2) Provisionally Approved as a malting variety

the HGCA Recommended Lists are available on the HGCA website (www.hgca.com)

feed variety. Depending on sample quality, it may be taken for pearling. There are concerns about its low rating for *Rhynchosporium* resistance especially in the West of Scotland where its infection levels are generally worse than Optic: in the East its infection levels have been lower and it has appeared to be more resistant. Its straw is of average length, stiff with a good rating for brackling resistance. It is earlier than Optic but not as early as Riviera. Apart from *Rhynchosporium*, disease resistance is good. It maintains its yield relatively well when late sown and is better suited to high yielding situations and following a break-crop rather than a cereal.

REBECCA (Nordsaat, Germany/ Saaten Union UK Ltd, Newmarket)

This recommended feed variety has produced high yields in the arable East of Scotland. Specific weight is rather low. Straw length is similar to Riviera. It is stiffer but has a low rating for brackling: this defect is less significant in such a tall variety and brackling can protect against ear loss. Maturity is average. Mildew has a resistance rating of 7 and in some areas it has been a problem since 2005; it has been reclassified to DG14 as it is vulnerable to the same mildew race as Oxbridge. *Rhynchosporium* resistance is above average. It is potentially vulnerable to yellow rust. It is rated good for retention of green leaf area but can be vulnerable to abiotic spotting and in 2006 its *Ramularia* resistance was downgraded. It tends to suit low yielding lighter textured sites especially those following a cereal.

DOYEN (New Farm Crops, Syngenta, Market Stainton)

This feed variety is beginning to look a bit overshadowed both for yield and disease resistance and its straw is shorter than average but stiff with good resistance to brackling. It has been reclassified into mildew DG3 while retaining a high degree of resistance. Although its *Rhynchosporium* rating remains at 7, there are potential vulnerabilities so growers should react to any unexpected appearance of *Rhynchosporium* in Doyen. It is potentially vulnerable to yellow rust. *Ramularia* resistance is weak so late season fungicide may be needed. It is not a profuse tillering variety. It has yielded relatively better in the North of Scotland, on heavier soils and in high yielding situations.

RIVIERA (RAGT Seeds Ltd., Cambridge)

A rather erratic feed variety that continues to yield very well in the West. Sometimes it is acceptable for pearling. It is tall and early. It has only moderate resistance to *Rhynchosporium* and abiotic spotting indicating a need for late season protection. It is readily infected with BYDV, is likely to need stiffening but has good resistance to brackling. It is better adapted to lower yielding low-ground situations. In late sown situations it maintains its yield better than most of the other recommended varieties.

WINTER BARLEY

IBD Approval for brewing

PEARL (Nickerson, Rothwell)

Carries IBD Approval for brewing; Pearl is the dominant malting winter barley variety with over 75% of the UK market. There is some Scottish interest in Pearl for brewing but growers should note that dormancy limits its use; it was the only winter malting variety purchased in Scotland in 2006. It is the tallest recommended two-row variety, with rather weak straw if not grown with a malting specification in mind. It ripens late. It is susceptible to winter-kill and net blotch. Pearl no longer makes a significant contribution to mildew diversification, it is susceptible at the seedling stage but has good adult plant resistance. It is sometimes used in blends to improve the specific weight of some of the six-row varieties. It looks relatively better on the heavier soils.

Six-row feed varieties

BRONX (New Farm Crops, Syngenta, Market Stainton)

This new provisionally recommended six-row variety is a hybrid, it heads the Recommended List for yield. It has a moderate specific weight and a high proportion of small grains. It is tall and in some trials has severely lodged but the results both with and without growth regulator are a bit erratic. Apart from brown rust, foliar disease resistance is good and it has resistance to BaMMV. It looks relatively better on heavier soils assuming adequate stiffening. Yield performance in SE Scotland has been relatively better than NE Scotland.

PELICAN (Nordsaat, Germany/Saaten Union UK Ltd, Newmarket)

This new provisionally recommended six-row variety has a low specific weight, similar to Amarena. It is very high yielding. The straw is stiff; it isn't as early maturing as the other six-row varieties. On current evidence it looks rather vulnerable to net blotch and *Ramularia* and scored badly for green

leaf area retention in an untreated trial. It has resistance to BaMMV. Yield performance has been relatively better on high yielding sites, light soils and in SE Scotland.

BOOST (New Farm Crops, Syngenta, Market Stainton)

This provisionally recommended six-row variety is a hybrid. It has a high specific weight, almost comparable with Sequel and low screening losses. Like Sequel, it has resistance to BaMMV, similar straw strength with similar or better disease resistance to all foliar diseases other than brown rust. It has average vulnerability to *Ramularia*. It looks suitable for pearling. Yield performance has been relatively better in SE than NE Scotland.

AMARENA (Saaten Union Recherche, France /Saaten Union UK Ltd., Newmarket)

This full recommendation is a six-row variety with a low specific weight. It is stiff. It has a very high untreated yield on the HGCA list; mildew resistance is exceptionally good, yellow rust and *Ramularia* are weaknesses. It does not have BaMMV resistance. It has moderately good winter-hardiness. It does relatively better in NE Scotland and has been disappointing in England. Yield performance has also been relatively better on low potential and lighter textured sites.

SEQUEL (New Farm Crops, Syngenta, Market Stainton)

This fully recommended six-row variety has a high specific weight: compared with Pict, it has significantly lower screening losses and is both taller and stiffer. It is early with moderately good winter-hardiness and useful BaMMV resistance but resistance to the rusts and *Ramularia* is only moderate. Bold samples may be accepted for pearling. It looks relatively better on the heavier soils. It yields relatively better in NE Scotland, on higher yielding sites and in coastal areas with a bias towards earlier sowing.

PICT (CPB Twyford Ltd., Cambridge)

This six-row variety has a high specific weight but compared with Sequel it is becoming outclassed. Its very small grain size may lead to excessive seed rates and screenings as well as adding to lodging pressure. It is weak in the straw especially if eyespot infection is not controlled. It is early with moderately good winter-hardiness and has resistance to BaMMV.

Two-row feed varieties

RETRIEVER (Sejet, Denmark/Nickerson, Rothwell)

This new provisional recommendation is a two-row feed variety, it has produced outstanding yields that seriously challenge the six-row varieties. In some trials Retriever looked disappointing but still produced excellent yields. Specific weight is rather low and screening levels are high compared with other recommended two-row varieties. Although it is relatively short, some unprotected trials have produced higher levels of lodging than would be expected with a rating of seven. Its high figure for yield loss if untreated also reflects vulnerabilities to mildew, net blotch and sometimes *Ramularia* but it scored well for green leaf area retention in one 2006 trial. On limited evidence it tends to yield relatively better on low potential sites, light soils and in NE Scotland.

ACCRUE (Saaten Union Recherche, France /Saaten Union UK Ltd., Newmarket)

This two-row feed variety will become a new provisional recommendation assuming it completes national listing. It is slightly higher yielding than Saffron, as stiff and better for both mildew and *Rhynchosporium*.

SAFFRON (CPB Twyford Ltd., Cambridge)

This fully recommended two-row feed variety has produced yields similar to the high specific weight six-row variety Sequel. It has good net blotch resistance but rather weak resistance to mildew and *Rhynchosporium*. It is short, stiff and late maturing with good green leaf area retention. It is particularly suited to high potential sites in SE Scotland.

CAMION (CPB Twyford Ltd., Cambridge)

This recommended two-row feed variety has an excellent specific weight. It is early and stiff but rather short and vulnerable to mildew. It has yielded particularly well on upland sites especially in NE Scotland and when sown early. It looks suitable for pearling.

WHEAT

Soft textured varieties are preferred by the distilling industry

ISTABRAQ (Nickerson, Rothwell)

A very high yielding variety: it is the only listed variety rated good for distilling with an alcohol yield significantly higher than Robigus and Consort. As a nabim Group 4 variety, it is unlikely to be used

for biscuit-making but it is listed for export as a **uks** variety. It has a high specific weight. The straw is tall and rather weak: as a late maturing variety, provisionally rated rather weak for sprouting resistance, avoid conditions where harvest is likely to be delayed. It has above average resistance to eyespot and *Fusarium* ear blight but vulnerability to *tritici* and especially mildew give it an above average response to fungicide. It has a relatively low vernalisation requirement. Early sowing should be avoided to avoid increasing the lodging risk. It has supported its relative yield potential over a range of sowing dates, rotations and soil textures especially in SE Scotland.

ALCHEMY (Nickerson, Rothwell)

A provisional recommendation; following some disappointing laboratory results in 2006, its distilling rating has been downgraded to medium and it will be looked at again in autumn 2007. Placed in nabim Group 4, it is unlikely to be used for biscuit-making but it has potential for export as a **uks** blending variety. By soft wheat standards it is high for both specific weight and Hagberg. An excellent untreated yield reflects a very good spectrum of resistance to the normal foliar disease threats in Scotland but a series of warmer summers could give rise to brown rust infections. The straw is a bit stiffer than its seven rating implies reaching a nine rating with PGR. Further evidence is needed before a provisional rating can be provided for sprouting.

It performs relatively better if sown after a break crop in high potential situations.

ROBIGUS (CPB Twyford Ltd., Cambridge)

Fully recommended, this soft wheat is graded medium for distilling and is suitable for biscuit-making; it is also listed as a **uks** variety for export. It is a small grained variety so should be sown by seed number. It is rated rather weak for sprouting and Hagberg. Straw strength is a little weaker than Consort. It is in the same group as Consort for yellow rust but is much more susceptible. During 2005 mildew appeared on Robigus, following further evidence in 2006 its rating has been downgraded to seven. Likewise its *Septoria tritici* rating has also been downgraded but it retains the top rating for *Septoria nodorum*. *Fusarium* and eyespot resistance are both rather weak. It is the only SAC fully recommended variety with resistance to orange blossom midge. It has a relatively low vernalisation requirement. Robigus is very high yielding in first cereal situations especially on high potential sites but its yield can be severely affected where it follows a cereal in the rotation.

CONSORT (RAGT Seeds Ltd., Cambridge)

This soft wheat is graded medium for distilling: it is readily used for biscuit flour and has characteristics that combined with high protein are needed for certain types of biscuit. It is listed as a **uks** variety for export. Against Robigus it is competitive in second cereal situations especially on the heavier soils and can be sown early; elsewhere a low yield, susceptibility to *Septoria tritici* and high fungicide inputs are eroding its market share. Placed in Diversification Group 7 for yellow rust; where this race develops on the more vulnerable Robigus, Consort will also need protection. It is late ripening and has stiff straw.

The other recommended varieties

OAKLEY (CPB Twyford Ltd., Cambridge)

This new provisional recommendation has produced some very high yields: it a hard endosperm nabim Group 4 wheat so there is little prospect of use for distilling or milling. It has a low specific weight and Hagberg. Although it needs and responds well to growth regulator it remains the weakest strawed variety on the SAC list. It has resistance to wheat orange blossom midge; it carries a low rating for eyespot resistance.

EINSTEIN (Nickerson, Rothwell)

This fully recommended hard endosperm variety is at the low end of nabim Group 2 for bread-making. It is widely used by some UK domestic millers and it has export potential as a **ukp** variety with Chopin figures that readily match the requirement for blended flour. High yielding varieties of this type need special attention to nitrogen management if the protein specification is to be achieved. Specific weight and Hagberg are moderately high but not as high as Cordiale. The straw is moderately stiff but was vulnerable to early root lodging in 2004. It has moderate all round disease resistance with *Septoria tritici* resistance tending to the weak. Resistance to *Fusarium* ear blight is moderate. It does well as a second cereal with a bias in favour of lighter soils and lower yield potential sites.

CORDIALE (CPB Twyford Ltd., Cambridge)

This recommended bread-making variety is in nabim Group 2. It is unlikely to earn a differential

premium as a named variety as it doesn't match Solstice for quality or Soissons for special use within the UK domestic market; it is used by some UK millers. It is listed as a **ukp** variety for export with good Chopin figures so it is well placed to exploit export markets. Both specific weight and Hagberg are very high. It requires a robust fungicide programme due to low resistance ratings for the rusts and *Septoria* diseases. It is early maturing with stiff straw, stiffer than Consort. It provides a useful choice as a second cereal especially in SE Scotland; it is a fast developer so care is needed if sowing early.

SOLSTICE (Nickerson, Rothwell)

At the top end of nabim Group 2 with upgrading being considered. It has some useful agronomic features so where the premium is high enough, it competes with Malacca, and compensates for the yield penalty against Einstein and Cordiale. There is evidence that millers want to encourage more Solstice; contracts are now available with a premium potential similar to Malacca. This **ukp** variety can also be sold into export markets. Specific weight and Hagberg are moderately high but not as high as Cordiale. It is stiff and has good resistance to sprouting. It is weak for mildew and eyespot. Its relative performance is a little better in the following situations, early sowing, second cereal, heavier land and NE Scotland.

MALACCA (CPB Twyford Ltd., Cambridge)

Comparable to Hereward for bread-making quality; it has sometimes produced slightly yellowish flour. This nabim Group 1 variety has an excellent Hagberg but its use is declining. With a low specific weight and a tendency to low protein there is a significant risk that the milling specification will not be achieved unless precautions are taken; this has led to some millers increasing their requirement for Solstice. Malacca is listed for export as a **ukp** variety suitable for blending. Additional fertiliser nitrogen and a shift to later applications should be adopted. It is early and has moderate foliar disease resistance but a low rating for eyespot resistance. Avoid high seed rates as this variety supports a high proportion of fertile ears per plant.

Winter varieties require vernalisation (some cold weather); this requirement limits their use for spring sowing. The latest safe sowing date in Scotland is likely to be at the end of February with varieties such as Istabraq and Robigus at the safer end of the spectrum. Spring varieties develop without needing vernalisation, they can be sown later in the spring but this leads to an even later harvest. The table on page 15 lists UK data for available recommended quality varieties; also of interest in Scotland for its soft endosperm is Shiraz with a yield of approximately 98%.

TYBALT (Wiersum, Netherlands/Nickerson, Rothwell)

A nabim Group 2 recommendation with a very impressive yield. With its very high yields, additional nitrogen will be required to meet the protein specification but growers should also note a provisionally low rating for straw strength especially when sown in the late autumn. The specific weight is close to the marketing standard.

ASHBY (CPB Twyford Ltd., Cambridge)

A popular nabim Group 2 variety with no significant agronomic weaknesses; it has a better specific weight than Tybalt. It matches Tybalt's yield when sown in late autumn.

PARAGON (RAGT Seeds Ltd., Cambridge)

The only fully recommended nabim Group 1 spring variety. As a late autumn sown variety it is 2% lower yielding than Malacca but sown in spring it is 16% below Tybalt. It has no significant agronomic weaknesses.

SPRING OATS

ASCOT (Wiersum, Netherlands/Nickerson, Rothwell)

A new provisional recommendation with useful yield potential but quality, in terms of kernel content, screenings and specific weight, look inferior to Firth. It produces tall straw of average strength. Late maturity will limit its potential use in Scotland.

ATEGO (Selgen, Czech Republic/Trevor Cope Seeds Ltd.)

A new provisional recommendation that needs careful protection against mildew if its yield potential is to be achieved. It matches Firth for screenings and specific weight but kernel content is low. Its maturity, earlier than Drummer, and stiff straw could be useful.

FIRTH (Lochow-Petkus, Germany/CPB Twyford Ltd., Cambridge)

Recommended for its yield, agronomic characters and quality. This combination has created a

dominant position at 40% of the 2006 UK seed area. For milling it has a combination of good kernel content, low screenings and moderate specific weight; millers also value its speed through the mill. In 2001 it showed a tendency to free shell putting at risk its acceptability for milling; reducing the drum speed should alleviate this problem if it reoccurs. In 2002 a high proportion of samples from NE Scotland were discoloured; there were also reports of discoloured groats in 2005.

WINSTON (Lochow-Petkus, Germany/Nickerson, Rothwell)

Recommended for its quality, resistance to mildew and short stiff straw. It is very similar to Firth but lacks market share (2% of UK seed area 2006). Milling potential looks provisionally good apart from a tendency to produce discoloured groats.

DRUMMER (Lochow-Petkus, Germany/Nickerson, Rothwell)

Recommended for its early maturity and good specific weight. Its tall very weak straw needs stiffening. Milling support is lukewarm and it lacks market share (4% of UK seed area 2006); groat size is rather mixed.

LEVEN (Lochow-Petkus, Germany/Nickerson, Rothwell)

This new provisional recommendation has a high kernel content and is likely to have milling potential. It is stiff, early and has good disease resistance but yield potential looks rather limited; it could have potential in organic and conservation grade systems.

WINTER OATS

Winter oats are widely grown. Earliness and yield relative to spring oats are major benefits. There is a substantial milling market for winter oats in Scotland: some of this must be PGR-free. Achieving PGR-free winter oats is likely to be more challenging than achieving PGR-free spring oats. As winter oats are less hardy than winter wheat and winter barley, they should be sown early to reduce the risk of winter-kill and plant heave. The yields given in the table are UK yields.

TARDIS (IGER, Aberystwyth/Senova Ltd., Cambridge)

This new provisional recommendation may be suitable for milling but the kernel content is only equivalent to Gerald and the specific weight is much lower. On current evidence it doesn't have any obvious agronomic weaknesses.

SW DALGUISE (Senova Ltd., Cambridge)

Yield in Scotland has been very variable with excellent yields in 2002 and 2004 but relatively disappointing yields in 2003 and 2005. On some sites lodging has reached very high levels indicating risk if PGR is omitted. It is early ripening. It has milling support with good colour, size and specific weight. Crown rust and mildew resistance are poor. Winter hardiness is above average.

SW KINROSS (Senova Ltd., Cambridge)

This general recommendation has no significant weaknesses; it yielded well in those years that SW Dalguise was disappointing. It may find a place in organic systems where very tall straw and relatively good mildew resistance are of interest but milling potential is limited. Winter hardiness is above average.

BROCHAN (IGER, Aberystwyth/Senova Ltd., Cambridge)

This new provisional recommendation looks likely to be suitable for milling with a kernel content much better than Gerald but specific weight could limit market acceptability. Short stiff straw could be useful when grown for the PGR-free market. It has limited resistance to both mildew and crown rust.

GERALD (IGER, Aberystwyth/Senova Ltd., Cambridge)

Historically popular with growers and acceptable to millers despite a low kernel content it is beginning to look past its best. The straw is short, mildew resistance is weak.

MASCANI (IGER Aberystwyth/Senova Ltd., Cambridge)

A recommendation for its good milling characteristics; disappointing yields are limiting uptake. It has relatively good resistance to mildew but could be affected by the Millennium race of crown rust.

NAKED OATS

Naked oats yield below 80% of the conventional varieties but they have the potential to earn a premium and should be grown on contract. The terms of the contract have an important bearing on the profitability of the crop. Naked oats should be regarded with some caution as they must not

			UK Grain yield as a % of fungicide treated controls	Yield loss if untreated %	% Kernel content	Screenings % < 2.0mm	Specific weight kg/hl	Maturity days + later - earlier than average	Straw strength 1-9 weak-strong	Straw length + taller cm - shorter than average	Crown Rust 1-9	Mildew 1-9
SPRING OATS (100 = 7.0 t/ha, 56 cwt/acre)												
2000	R	Firth	100	10	75.0	0.7	53.6	+1	6	-5	5	8
1999	R	Winston	100	9	75.4	0.6	54.2	+1	7	-4	5	8
1997	R	Drummer	98	9	72.0	0.6	54.6	0	5	+7	5	6
2007	P1	Ascot	105	12	72.4	(1)	52.5	+3	6	+6	(4)	6
2007	P1	Alego	103	18	72.2	(0)	53.4	-2	7	-4	(7)	4
2007	P1	Leven	97	7	76.4	(0)	53.9	-2	8	-3	(7)	8
WINTER OATS (100 = 8.3 t/ha, 66 cwt/acre)												
2003	R	SW Dalguise	101	17	75.0	0.2	55.6	-1	7	+3	3	3
2004	R	SW Kinross	100	8	74.3	0.5	53.9	+2	7	+12	7	6
2004	R	Mascari	98	6	77.3	0.1	55.1	0	7	+1	(6)	6
1999	R	Gerald	98	13	72.3	0.2	54.2	+1	7	0	5	4
2007	P1	Tardis	103	13	72.2	0	51.5	-1	7	-6	7	7
2007	P1	Brochan	100	12	76.5	0	51.8	+1	8	-12	5	5
SPRING WHEAT (100 = 7.4 t/ha, 59 cwt/acre)												
2003	R	Tybalt	110		2	298	76.0	0	(3)	-2	7	(9)
2001	R	Ashby	104		2	303	78.2	+1	7	0	5	(7)
1999	R	Paragon	94		1	314	76.8	0	6	+3	6	(7)
						Colour code	Good	Tends to be good	Intermediate	Tends to be poor	Poor	

R = Recommended for general use	P = Provisional
S = Specific Use Variety	O = Becoming outcrossed

The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com)

be harvested before fully mature and particular care is needed in drying and handling this crop. Information on naked varieties may be obtained from the HGCA website. There is a market for naked oats in the poultry industry.

SPECIAL RECOMMENDATIONS FOR THE WEST

A few varieties perform rather better or worse in the wetter conditions of the west than in the drier east, these are highlighted in this section:

Spring barley:

Riviera continues to produce competitive yields in the SW Scotland; Optic, Doyen and Rebecca have under-performed. Westminster also yields well and looks useful for whole-crop. Waggon has produced excellent yields but with a risk of severe *Rhynchosporium* infection if unprotected.

Winter barley:

The six-rows tend to do well especially the hybrid Boost.

Winter wheat:

For distilling: Istabraq has yielded well: Robigus is penalised as it is a disappointing second cereal. Consort under-performs. There is insufficient data for Alchemy but it looks promising.

For bread-making: Cordiale has done particularly well with its early maturity and very stiff straw producing a yield on a par with Einstein. Solstice also yields well in the West with a substantial advantage over Malacca.

For whole-crop: In the absence of yellow rust, Robigus yields well providing it follows a break crop. If following a cereal, Istabraq is worth considering but watch its vulnerability to lodging and mildew. Alchemy looks promising.

For further information consult your local SAC Advisory Office.

SAC Cereal Specialists may be contacted at:

SAC Agronomy Select, Pentland Building, Bush Estate, Penicuik, Midlothian EH26 0PH (0131 535 3300) and SAC Agronomy Select at Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen AB21 9YA (01224 711000)

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